Leica Steer Ready Kit
Installation Manual

Tractor Model:

Case Magnum MX Trimble Autopilot™

Auto-steer Retrofitted

Version 1.2.0
English

- when it has to be **right**

Leica Geosystems

Introduction

Purchase

Congratulations on your purchase of a new Leica Steer Ready Kit.

This manual contains important safety directions as well as instructions for installing the product and operating it. Refer to the Safety Directions for further information. Read carefully through the Installation Manual before you begin operation of machinery.

The Leica Steer Ready Kit is to be used solely in combination with Leica mojoRTK system. Therefore it's mandatory to also observe the directions and instructions contained in the Leica mojoRTK User Manual.

To ensure safety when using the system, please also observe the directions and instructions contained in the User Manual and Safety Handbook issued by the:

- Agricultural machinery manufacturer.

This manual describes how to install the Leica Steer Ready Kit. Even if you have installed other Leica Geosystems products before, we recommend you read this manual to ensure correct installation of this product.

Product Identification

The model and serial number of the Leica Steer Ready Kit are indicated on the packaging. Please enter them here, and always refer to this information when you need to contact your agency or Leica Geosystems authorized service workshop.

Make: _____

Model: _____

Serial No.: _____

Symbols

Symbols used in this manual have the following meanings:

Type	Description
Danger	Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
Warning	Indicates a potentially hazardous situation or an unintended use which, if not avoided, could result in death or serious injury.
Caution	Indicates a potentially hazardous situation or an unintended use which, if not avoided, may result in minor or moderate injury and / or appreciable material, financial and environmental damage.
	Important paragraphs which must be adhered to in practice as they enable the product to be used in a technically correct and efficient manner.

Note - The absence of specific alerts does not mean that there are no safety risks involved.

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1 Product Overview

Benefits

The Leica Steer Ready Kit is the first step in getting your equipment Leica mojoRTK ready.
It consists of a Steer Ready Controller & associated Wiring Harness, brackets and bolts which will form the foundation of your new auto-steer solution.

The Leica Steer Ready Kit is designed to be used in conjunction with the Leica mojoRTK console. The installation of a Leica mojoRTK console is not included in this manual. Please refer to your local dealer or the relevant manual for further details on this product.

The Leica Steer Ready Kit is suitable for all Case Magnum MX tractors which have been retrofitted with Trimble Autopilot valves. Certain vehicle variations and non-standard modifications may affect some cable lengths. Extension cables may be required, see your local Leica Dealer.

This installation manual will provide the necessary steps to successfully install the Leica Steer Ready Kit.

To understand the user manual

To ease the use of this manual please observe the following advice:
Relating to all pictures and schematics, they are to be seen as reference only. There may be slight deviations from the actual looks of the Leica Steer Ready Kit. These deviations are caused by individual applications and have no impact on the function capabilities of the Leica Steer Ready Kit.

Use only original parts

Leica Geosystems original spare parts are especially designed for the Leica Steer Ready Kit. They live up to the high design standards for safety and reliability. We advise you, that components or parts, not provided by Leica Geosystems for the Leica Steer Ready Kit should not be used because they might jeopardize the safety and function of the Leica Steer Ready Kit. We therefore can not be responsible for such redesign or adaptations. Any obstinate changes on our Leica Steer Ready Kit void the company warranty. In addition conformity declaration or local authority regulations could be voided. This also applies to the removal of factory applied seals.

The Leica Steer Ready Kit supports you and improves your efficiency, while working in the field. The responsibility for quality and work related results rests as always with the driver. As common with most all machinery the basic rule applies. The more exact the system is adjusted, calibrated and operated the higher the quality of results will be.

2 Pre-Installation Vehicle Preparation

1. Park the vehicle on a hard, level surface and block the front and rear wheels.
2. Align the steering wheels straight ahead.
3. Remove all dirt and trash from the areas of the vehicle where the Leica Steer Ready Kit will be installed.
4. Lower the 3 point hitch to its lowest point. Consult the Tractor's Operator's Manual for assistance.

Note: The left and right hand sides of the vehicle are referenced while standing behind the vehicle, facing the normal direction of travel.

3 System Description

General

The Leica Steer Ready Kit is capable of interfacing to existing actuators and sensors to steer vehicles like tractors and other self propelled machines in agriculture and forestry applications.

The Leica Steer Ready Kit is composed of the Steer Ready Controller and associated cabling. The Leica Steer Ready Kit is designed to interface to the Leica mojoRTK system via CAN bus.

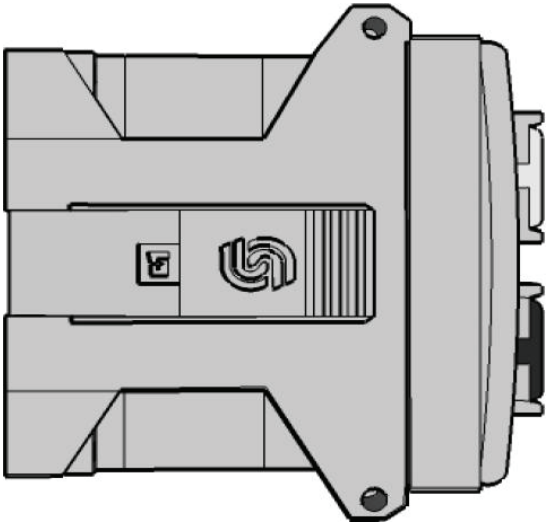
The Leica Steer Ready Kit is designed to assist the machine operator to use the equipment more efficiently.

Caution

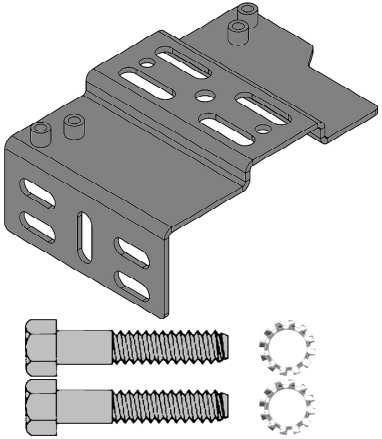
Even when relying on the function of the Leica Steer Ready Kit the driver is still responsible for observation of the machine and the surrounding area. He should shut down or assume manual steering control in dangerous situations. To shut down the Leica Steer Ready Kit turn off the power switch so that the light is off.

4 Equipment List

4.1 SRK Part A – 676035

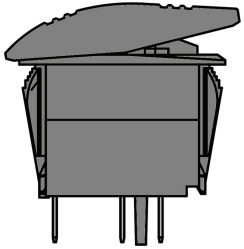


Qty	Description	Part #
1	Steer Ready Controller	676171

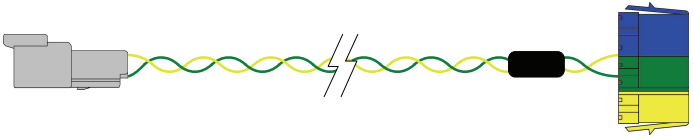


Qty	Description	Part #
1	Universal Bracket	676173
2	M6 x 60mm Bolt	
2	M6 Star Washer	

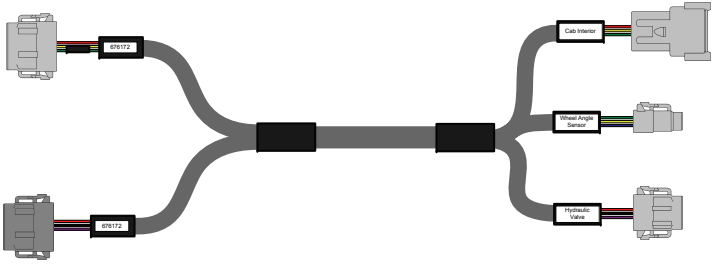
Qty	Description	Part #
1	CAN Extension Cable	676030



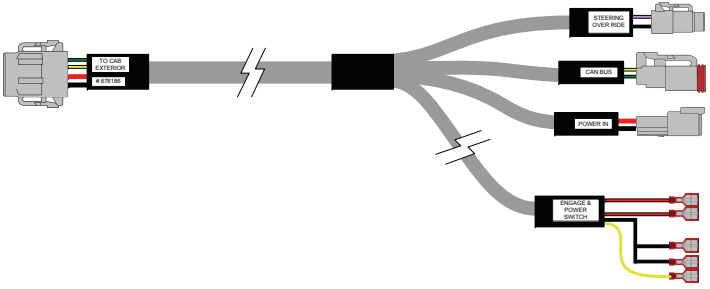
Qty	Description	Part #
1	Engage Switch	676191



Qty	Description	Part #
1	mojoRTK SRK ISO-C Cable	676591



Qty	Description	Part #
1	Wiring Harness – SR Controller	676172

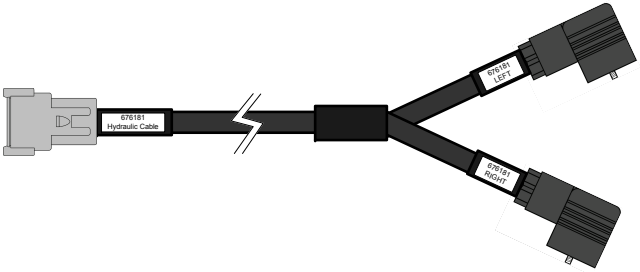


Qty	Description	Part #
1	In-Cab Wiring Harness	676186

4.2 SRK Part B – 676038

Qty	Description	Part #
1	Case Power Cable	676178

Qty	Description	Part #
1	Trimble Override cable	676033

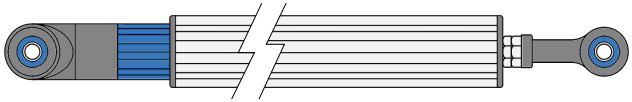


Qty	Description	Part #
1	Trimble Hydraulic Valve Cable	676181

Qty	Description	Part #
1	M8 Nyloc Nut	
1	M8 Flat Washer	

4.3 SRK Part C – 676022

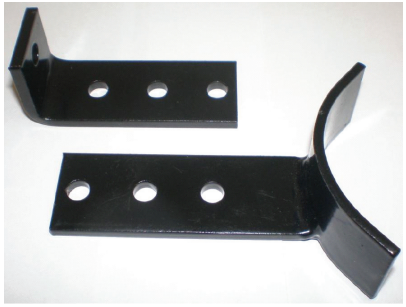
SRK Open kits do not include these components.
For more information consult your dealer.



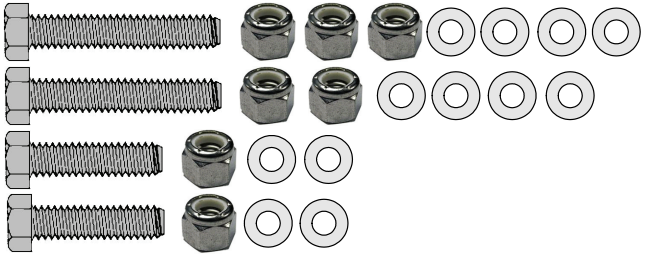
Qty	Description	Part #
1	Linear Sensor 250mm	676001

Qty	Description	Part #
1	Linear Sensor Mounting Bracket	676004

Qty	Description	Part #
1	Worm Drive Clamp 32-50mm	676003
1	Worm Drive Clamp 70-90mm	676002



Qty	Description	Part #
1	Linear Sensor Shaft End Brackets	676008



Qty	Description	Part #
2	M5 x 45 Bolt	676005
2	M5 x 25 Bolt	676009
8	M5 Nyloc Nut	676006
12	M5 Flat Washer	676007

Qty	Description	Part #
2	Wheel Angle Sensor Extension Cable	676175

5 Controller Installation

Before commencing the Installation, lower the 3 point linkage of the tractor to its lowest point and turn the front wheels of the tractor so that they are positioned straight ahead. Consult the Tractor's Operator's Manual for assistance.

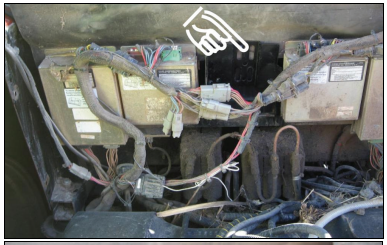
Danger Before beginning this section of the installation, please ensure that the vehicle is turned off and a **DO NOT START** tag is attached to the ignition.

The following will give a general outline of the steps necessary to install the SRK Controller assembly.

5.1 SR Controller Bracket Mounting

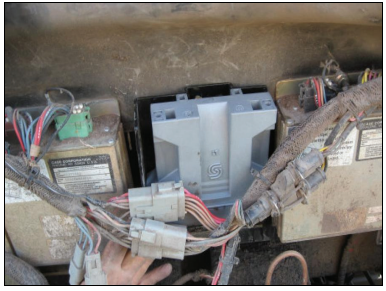
Step 1: Working from the rear of the vehicle, remove the rear panel by undoing the bolts on either side of the cab as shown and lifting.

Step 2: To locate the mounting position shown *right* and lift the rubber flap. The SR Controller Bracket slotted bolt hole will align with an existing bolt located on the edge, under the rear window of the Cab towards the middle.



Step 3: Once located, mount the SR Controller Bracket to the vehicle. Use the M8 nut and washer to attach it to the mounting bolt.

Step 4: Mount the Steer Ready Controller to the bracket using the M6 bolts and washers as supplied.



6 Installing the Steering Sensor

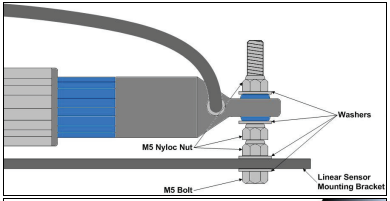
6.1 Mounting the Steering Sensor

Danger Before beginning this section of the installation, please ensure that the vehicle is turned off and a **DO NOT START** tag is attached to the ignition.

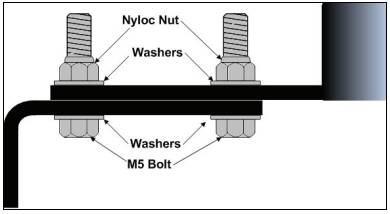
Warning The tractor needs to be started and stopped during the mounting of the steering sensor. Ensure that any covers or other items that have been removed to this point in the installation are in a safe position and that the tractor is in a generally safe condition before it is started.

Step 1: Refer to Section 4.3 of the equipment list to ensure that you have the correct parts.

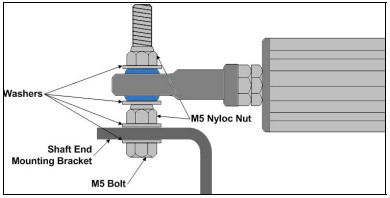
Step 2: Using the 45mm M5 bolt, attach the cable end of the linear sensor (676001) to the linear sensor mounting bracket (676004).



Step 3: Join the two parts of the shaft end bracket 676008 using the two M5 x 25mm bolts, two Nyloc nuts and four washers as shown.



Step 4: Attach the non-sensor end of the linear sensor to the shaft end bracket assembly using the 45mm M5 bolts as shown.



Step 5: Start the tractor and turn the steering wheel hard lock to the right. Stop the tractor.

Step 6: Using the smaller worm drive clamp mount the shaft end bracket of the linear sensor assembly to the most left point of the left side steering ram as shown.

Step 7: Using the two larger worm drive clamps mount the other end of the linear sensor assembly to the cylinder of the steering ram as shown. The sensor should be mounted just under full extension at full lock.

Step 8: Start the tractor again and slowly turn the wheels from lock to lock. Check that there are no obstructions and the steering ram can not force the sensor past its mechanical stops.

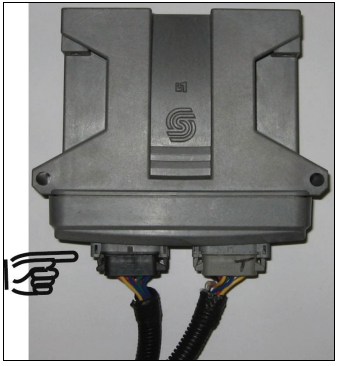
7 Routing the Wiring

7.1 Connecting to the SR Controller

Danger Before beginning this section of the installation, please ensure that the vehicle is turned off and a **DO NOT START** tag is attached to the ignition.

It is essential that the cables are routed throughout the vehicle in a position that is away from excessive vibration & heat sources such as exhaust manifolds and / or radiators. Also ensure that there is enough length in the cable to prevent stretching or excessive tension whilst the vehicle is in normal operation, making sure that it can be mounted securely.

Step 1: Refer to Section 4.1 of the equipment list to ensure that you have the correct Wiring Harness (Part No. 676172).



Step 2: Locate the Steer Ready Controller that was mounted to the vehicle in Section 5 of this manual.

Step 3: Connect the black Deutsch connector of the Wiring Harness to the black rimmed socket of the Steer Ready Controller.

Step 4: Connect the grey Deutsch connector of the Wiring Harness to the grey rimmed socket of the Steer Ready Controller.

Step 5: Leave the other end of the SR Controller wiring freely available, as each of these available connectors will be used for the various components of the Leica Steer Ready Kit.

7.2 Routing the Hydraulic Valve Cable

Step 1: Refer to Section 4.2 of the equipment list to ensure that you have the correct Wiring Harness (Part No. 676181).

Step 2: Working from the LHS of the vehicle, the Hydraulic Steering Control Valves of the vehicle are located on the side of the chassis just in front of the Cab. Unscrew the bolts to remove the cover.

Step 3: The Hirschmann plug connections are on the bottom side of the solenoid. Plug the Hirschman plugs to the solenoids.

Note: The cable has two Hirschmann plugs, one is marked **Right** and the other **Left**. The one marked **Left** connects to the front solenoid of the valve and the one marked **Right** connects to the solenoid at the rear of the valve.

Step 4: Working from this connection with the hydraulic valve, route the cable under the Cab to the SR Controller. Ensure that it is suitably positioned and secured with the cable ties, and connect to the SR Controller Harness that was fitted in section 7.1.

7.3 Routing the In-Cab Harness

Inside the vehicle cab there are essentially four connections to be made with the In-Cab Wiring Harness. They are the connection to the Leica mojoRTK console, the auto engage switch, the manual override cable and the power supply cable.

Step 1: Refer to Section 4.1 of the equipment list to ensure that you have the correct In-Cab Wiring Harness (Part No. 676186).

Step 2: Locate the entry point into the vehicle's cab at the rear right side of the cab. This will provide entry into the cab space near the implement controls.

Step 3: Make a small hole in the rubber and feed the end of the long cable of this harness through the hole from inside the cab.

Step 4: Locate the Steer Ready Controller Harness that was fitted in Section 7.1 and connect to the cable of the In-Cab harness that was fed through the hole. Any excess cable can be rolled into a gentle loop and secured using cable ties.

Step 5: Locate the mounting position of the associated Leica mojoRTK console, which will typically be the vehicle's factory fitted radio DIN slot.

Step 6: Remove the Leica mojoRTK console from the DIN slot using the tools supplied in the Leica mojoRTK console kit and plug the CAN cable (Part# 675591) into ISO-C plug in the rear of the unit.

If the Leica mojoRTK console has not yet been installed, refer to the Installation Manual for this product and prepare to install it now. If this product is not available for install, Skip Step 6 and return to it later.

Step 7: Connect the other end of the CAN cable to the CAN extension cable (Part# 676030). Connect the extension cable to the In-Cab harness.

Step 8: The CAN cable and its extension can be fed behind the panel, then to the rear right behind the cab roof lining.

Step 9: Remove the cab pillar panel and conceal the cable behind this panel. Ensure that all connectors are easily accessible for further installation. Any excess cable can be rolled into a gentle loop and secured using cable ties.

7.4 Routing the Wheel Angle Sensor Harness

This Section is not applicable to SRK Open kits. If installing an SRK open system proceed to Section 7.5.

Step 1: Refer to Section 4.1 of the equipment list to ensure that you have the correct Wiring Harness (Part No. 676175).

Step 2: From the Linear Sensor mounted in Section **Error! Reference source not found.** connect the Wheel Angle Sensor extension cable to the linear Sensor cable.

Step 3: Route the extension cable under the cab to the SR controller cable installed in Section 7.1, connect to this cable. If the cable is too short use both extension cables to reach.

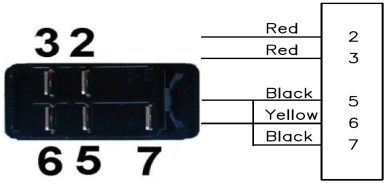
7.5 Installing the Engage Switch

Step 1: Refer to Section 4.1 of the equipment list to ensure that you have the auto-steer engage switch (Part #- 676191).

Step 2: The auto-engage switch is to be installed in the panel on the right armrest. There should be a spare place for a switch with a blank insert in the hole. The blank can be removed by lifting it with a small flat blade screw driver.

Step 3: Feed the cable for the auto-steer engage switch up from under the console to the position that the switch will finally be placed.

Step 4: Connect the switch to the cable crimps as indicated in the diagrams to the *right*. Numbers are labeled on the crimps as well as the switch to assist in this step.



Step 5: Press the switch into the console so that the side that locks down when pressed is towards the back of the machine.

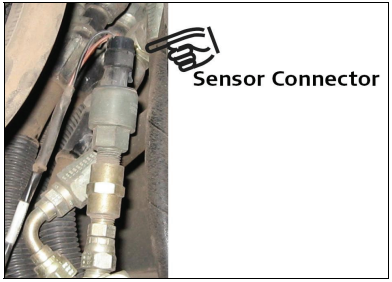
7.6 Routing the Override Harness

Step 1: Refer to Section 4.1 of the equipment list to ensure that you have the manual override cable (Part No. 676033).

Step 2: The sensor to which the manual override cable is to be connected is located in the same area as the other hydraulic valves associated with the auto steer.

Step 3: Feed the manual override cable through the entry point into the vehicle's cab at the rear right side of the cab, under the vehicle cab through to the left hand side of the vehicle at the front of the cab.

Step 4: Plug the manual override cable onto the sensor connector as shown.



Step 5: Plug the other end of the manual override cable into the In-Cab harness.

7.7 Routing the Power Cable

Step 1: Refer to Section 4.1 of the equipment list to ensure that you have the correct power cable (Part No. 676178).

Step 2: The vehicle's auxiliary power connector is located on the right side of the vehicle's cab below console. Connect the Power supply to the In-Cab harness and connect it to the power connector.

Note: The power cable needs to be tucked behind the vehicle cab lining.

7.8 Wiring Check

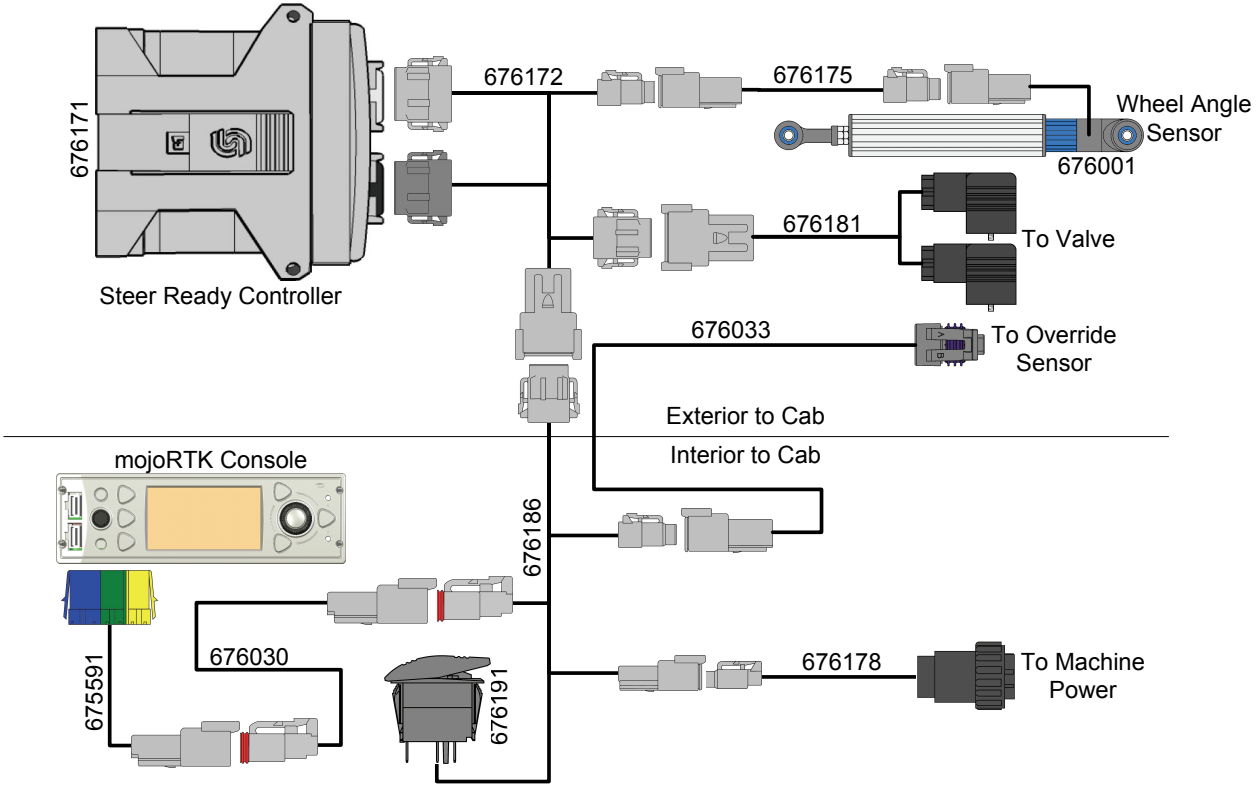
Before switching the controller on, use the diagram in Section 8 to check the wiring of the system. All connectors should be inserted until they have clicked.

7.9 Secure Cable Harnesses

Once the cabling is correct, use the supplied cable ties to secure the harnesses. Where possible group the cables to use only one cable tie. Secure the cables to other cable harnesses or vehicle structure (only when it will not cause the cable to be damaged). If cables are too long, wind them up to an appropriate length and tie together.

Tuck all cables in the cab away or under the floor lining so they cannot be tripped on or damaged.

8 Wiring Harness Diagram



9 Safety Directions

9.1 General

The Leica Steer Ready Kit is to be used solely in combination with Leica mojoRTK system. Therefore it's mandatory to also observe the directions and instructions contained in the Leica mojoRTK User Manual.

Description

The following directions should enable the person responsible for the product, and the person who actually uses the equipment, to anticipate and avoid operational hazards.
The person responsible for the product must ensure that all users understand these directions and adhere to them.

9.2 Intended Use

Permitted Use

- The Leica Steer Ready Kit is exclusively developed for usage in agriculture or forestry by persons in control.
- The Leica Steer Ready Kit is only intended to be fitted to agricultural tractors. It is not permitted to install this product in any other vehicles.

Adverse Use

- Use of the product without instruction.
- Use outside of the intended limits.
- Disabling safety systems.
- Removal of hazard notices.
- Opening the product using tools, for example screwdriver, unless this is specifically permitted for certain functions.
- Modification or conversion of the product.
- Use after misappropriation.
- Use of products with obviously recognizable damages or defects.
- Use with accessories from other manufacturers without the prior explicit approval of Leica Geosystems.
- Inadequate safeguards at the work site, for example when using on the intended site.
- The Leica Steer Ready Kit is not suitable for applications on narrow dikes or on steep hillsides, where danger of vehicle roll over exists.

Warning

Adverse use can lead to injury, malfunction and damage. It is the task of the person responsible for the equipment to inform the user about hazards and how to counteract them.
The product is not to be operated until the user has been instructed on how to work with it.

Warning

Unauthorized modification of agricultural machine by mounting or installing the product may alter the function and safety of the machine.

Precautions:
Follow the instructions of the machine manufacturer. If no appropriate instruction is available, ask machine manufacturer for instructions before mounting or installing the product.

9.3 Limits of Use

Environment

Suitable for use in an atmosphere appropriate for permanent human habitation: not suitable for use in aggressive or explosive environments.

Danger

Local safety authorities and safety experts must be contacted before working in hazardous areas, or in close proximity to electrical installations or similar situations by the person in charge of the product.

9.4 Responsibilities

Manufacturer of the product

Leica Geosystems AG, CH-9435 Heerbrugg, hereinafter referred to as Leica Geosystems, is responsible for supplying the product, including the user manual and original accessories, in a completely safe condition.

Manufacturers of non Leica Geosystems accessories

The manufacturers of non Leica Geosystems accessories for the product are responsible for developing, implementing and communicating safety concepts for their products, and are also responsible for the effectiveness of those safety concepts in combination with the Leica Geosystems product.

Person in charge of the product

- The person in charge of the product has the following duties:
- To understand the safety instructions of the product.
- To be familiar with local regulations relating to safety and accident prevention.
- To inform Leica Geosystems immediately if the product and the application becomes unsafe.

Warning

The person responsible for the product must ensure that it is used in accordance with the instructions. This person is also accountable for the training and the deployment of personnel who use the product and for the safety of the equipment in use.
Unauthorized modification of machines by mounting the product may alter the function and safety of the machine.

Warning

Precautions:
Follow the instructions of the machine manufacturer. If no appropriate instruction is available, ask machine manufacturer for instructions before mounting the product.

9.5 Hazards of Use

Only Leica Geosystems authorized service workshops are entitled to repair these products.

Warning

Beware of inadequate steering if machine is defective like after a crash or other damaging events or alterations to the machine.
Precautions:
Periodically perform control measurements and field adjustments on the machine as specified in the User Manual.

Warning

While steering or navigating the machine accidents may occur due to a) the operator not paying attention to the surroundings (persons, ditches, traffic, etc.), or b) malfunctions (...of a system component, interference, etc).
Precautions:
The operator assures that the machine is operated, guided and monitored by a qualified user (e.g. driver). The user has to be able to take emergency measures, for example an emergency stop.

Warning

The absence of instruction, or the inadequate imparting of instruction, can lead to incorrect or adverse use, and can give rise to accidents with far-reaching human, material, financial and environmental consequences.

Precautions:

All users must follow the safety directions given by the manufacturer and the directions of the person responsible for the product.

Warning

During dynamic applications, there is a danger of accidents occurring if the user does not pay attention to the environmental conditions around, for example obstacles, excavations or traffic.

Precautions:

The person responsible for the product must make all users fully aware of the existing dangers.

Warning

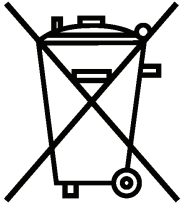
Inadequate securing of the work site can lead to dangerous situations, for example in traffic, on building sites, and at industrial installations.

Precautions:

Always ensure that the work site is adequately secured. Adhere to the regulations governing safety and accident prevention and road traffic.

Warning

If the product is improperly disposed of, the following can happen:
If polymer parts are burnt, poisonous gas are produced which may impair health.
By disposing of the product irresponsibly you may enable unauthorized persons to use it in contravention of the regulations, exposing themselves and third parties to the risk of severe injury and rendering the environment liable to contamination.



Precautions:

The product must not be disposed with household waste. Dispose of the product appropriately in accordance with the national regulations in force in your country. Always prevent access to the product by unauthorized personnel.

Product specific treatment and waste management information can be downloaded from the Leica Geosystems home page at http://www.leica-geosystems.com/treatment or received from your Leica Geosystems dealer.

Warning

On public roads and drives always disengage the Leica Steer Ready Kit via the power switch. For safety reasons it is better if you keep one hand on the steering wheel, when using the Leica Steer Ready Kit at speeds over 6 mph (10 km/h). In case of malfunction you are able to take action immediately.

Warning

With exemption of the driver no other person should ride in the drivers area of the vehicle fitted with a Leica Steer Ready Kit. Additional persons could distract or block visibility of the driver from operating and observing the Leica Steer Ready Kit which could lead to dangerous situations.

Warning

The presence of a rider on a passenger seat is only acceptable for brief observations or for training purpose. The passenger seat is never considered a children seat. Only persons especially experienced, with the operation of the machine, should be considered for schooling on a machine which is fitted with a Leica Steer Ready Kit.

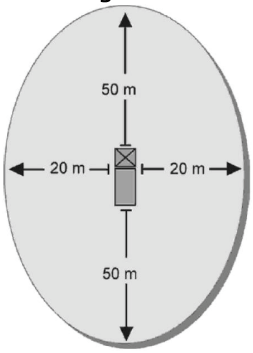
Danger

Pay special attention that no children are near or on the vehicle which is fitted with a Leica Steer Ready Kit, especially when the Leica Steer Ready Kit is active. Children are unpredictable and supervision is limited when operating the Leica Steer Ready Kit. They might be exposed to additional danger.

Caution

Before starting field work make yourself comfortable with the use of the Leica Steer Ready Kit and the vehicle. As soon as the Leica Steer Ready Kit is activated, an adult, responsible person has to be in charge of supervision and monitoring. In dangerous situations it is always safer to disengage the Leica Steer Ready Kit and drive by hand, in order to avoid personal injury or material damage.

Danger Zone



At no time should there be any person within the danger zone after the Leica Steer Ready Kit is activated.
At any sign of danger the operator should deactivate the Leica Steer Ready Kit immediately. He has to ask any person within the danger zone to leave promptly. Only when there are no more people within the danger zone can he re-activate the Leica Steer Ready Kit.
For service and control duties only authorized persons can enter the danger zone, after verbal confirmation with the operator. Such people have to be clearly informed about possible dangers before entering the danger zone. All activities between the operator and these persons should be discussed before hand. All service, adjustment and control duties on this Leica Steer Ready Kit should only take place if technically possible, on a parked vehicle with the engine turned off.

Danger

People present within the danger zone are exposed to serious bodily harm or even death. People could be run over in case of malfunction of the machine. The operator is obligated to stop the vehicle as soon as people enter the danger zone.

Prepare for possible emergencies

- Always have a fire extinguisher and First Aid kit at hand.
- Always have actual emergency phone numbers for Fire department, ambulance and doctor handy.

Purchase Returns

Leica Geosystems offers customers the ability to return any agricultural products purchased within Australia under our exclusive **8n8 Satisfaction Guarantee** Program. You will receive a full refund of your purchase price if you meet the following criteria:

The equipment must be returned and received in the Leica Geosystems Brisbane Qld office within **8 days** of the invoice date.

The equipment must have no more than **8 hours** of auto-steer operating time on the system meter.

The equipment must be in 'as new' condition and in original packaging.

If you are not satisfied for any reason, you may return your new mojoRTK products... no questions asked. This is the Leica 8n8 Satisfaction Guarantee.

Warranty

Leica Geosystems offers its Standard International Warranty which is 12 months for all agricultural product purchases, and 90 days for battery products. Please go to the website to review the warranty document.

676107 (Version 1.2.0en)
Original text
Printed in Singapore © 2009 Leica Geosystems Pty Ltd, Brisbane, Australia

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- when it has to be **right**

Leica Geosystems